both intermediate forms like the hybrids of the second generation and forms which have reverted to the brown grandparent, as the white doves have seemingly returned to the white grandparent." Here we have a clear recognition of what Mendel calls dominance! Also, this, (p. 48): "If a spermatozoön and an egg containing characteristics of the same species unite, then the reversion will be to that of the species; if a sperm cell containing the characteristics of one species happens to unite with an ovum containing characteristics of the other species, then the offspring will be of the mixed type again. By the law of probability the latter will be the more prevalent occurrence, because there are four combinations possible, and two of the four would result in the production of mixed offspring, while only one combination could result in a return to one of the ancestral species." Here we have even the quantitative part of Mendel's law expressed in 1900!

The foregoing Mendelian generalizations are suggested by the behavior of the hybrid germ cells in the spermatogenic stages. The mitoses are frequently abnormal — two spindles lying side by side, owing to the fact that the chromosomes are segregated in different parts of the cell. This segregation suggests an incompatibility between the chromosomes of the two species — and it results in "pure" germ cells — with the parental qualities segregated.

Finally, the all too brief chapter of suggestions will repay careful study. It is regrettable that so notable a contribution to the mechanism of heredity should have been so long delayed in appearing.

C. B. D.

Inheritance of Acquired Mental Characteristics.[1] — A Chicago solicitor of patents has written a book on heredity that is bold and in many respects crude, but which presents so many facts that it warrants respectful consideration. The subject is the control of the intellectual quality of the offspring by the intellectual activity of the parents. The thesis is that the descendants of intellectually active parents inheret the latter's activity so that, within limits, the more active during a given time the parents have been, or the longer the time of their activity, the more intellectually active the offspring, the greater their chance of achieving eminence. It is nothing new, of course, that the offspring of intellectual or successfully active people are especially apt to have eminent progeny, but it is rather new to

[1] Redfield, C. L. *Control of Heredity.* A Study of the Genesis of Evolution and Degeneracy. Chicago, A. C. Clark, 1903. 8vo. 343 pp., illustrated.

be told that of the progeny of such eminent people the younger sons are more likely to be eminent than the older sons; or conversely, that eminent men, in general, particularly when not sons of eminent men are sons of old men.

To prove the thesis stated in the last paragraph it would be necessary first of all to find the average age a large random sample of mothers and of fathers of a given race and time at the birth of all their children and then to show that eminent people (using as a measure of eminence some arbitrary standard such as the average number of lines in the biographical descriptions in a number of encyclopedias) were born of parents clearly older than the average of parents of that race and time. But even this would not be wholly satisfactory. It would be better to compare the average eminence of the earlier and the later born of pairs of brothers. If the average eminence of the later born brothers exceeded that of the earlier born by several times the probable error then the greater chance of eminence of younger sons could be said to be demonstrated. But even if the younger sons showed a clearly greater eminence, still we could not assert that this greater eminence was due to inheritance of acquired intellectual activity of the parents rather than to the possible superior training of later sons.[1] Now Mr. Redfield has not treated his statistics of eminence in relation to birth rank with sufficient care; he is convinced of the truth of his theory; and he uses all of the art of a skillful lawyer to prove it.

Mr. Redfield got a standard average age of Caucasian parents in general from the Redfield genealogy, which indicates that 50% of children are born from fathers under 33 years and mothers under 29 — these ages are taken as his standard although he thinks them a trifle high for Caucasians in general. He compares with this standard the father's age of eminent men at the time of the latter's birth, gleaning his facts from encyclopedias, and finds many cases of sons of old men. He devotes one chapter to "The Hall of Fame" men. He finds among these many cases of exceedingly old parentage. For instance when Franklin was born his father was 51; and the total interval in three generations is $51 + 57 + 70 = 178$ years. On the other hand the average birth rank of Eli Whitney's male ancestors was 30 and for 25 Hall of Fame men the median paternal birth rank is 35.5 years, not much above Redfield's standard.

[1] To avoid the possible influence of superior training of younger children records of trotting horses or milk-cattle would be superior to records of men. Mr. Redfield thinks his theory confirmed in trotting horses.

The argument is weakened by including the birth ranks of Joseph, Moses, David and Solomon! We have little reliable information concerning the ages of the ancestors of these men. Also, our confidence in Mr. Redfield's critical ability is terribly shaken by his comparison of maternal impressions to mimicry, and by his attempting to account for the intellectual inferiority of the lower animals solely on the ground of their shorter generations.

Despite, however, all the crudities of the book we cannot deny that it contains suggestions and that many of the conclusions cannot, in our present state of knowledge, be refuted. The work should incite to further and more careful investigation to confirm or refute Mr. Redfield's theory, or, rather, to see if statistical evidence supports the hypothesis of the inheritance of acquired dynamical qualities.

C. B. D.

BOTANY.

Notes.— Lieforung 29–30 of Ascherson and Gräbner's *Synopsis der mitteleuropäischen Flora* deals with Cyperaceæ, Araceæ and Palmæ, — among the latter characterizing American and other foreign species that are hardy in cultivation.

No. 26 of the new series of "Contributions from the Gray Herbarium of Harvard University," forming Vol. 39, No. 11, of the *Proceedings of the American Academy of Arts and Sciences*, is a revision of the genus Flaveria, by J. R. Johnston.

Under the title *Arkiv för Botanik*, a new serial has been launched by the K. Svenska Vetenskaps-Akademie. Several of the papers of the opening number are of interest to American botanists.

After a long interval, parts 3 and 4 of *Muhlenbergia* has appeared, and contain descriptions of a number of western phanerogams by Heller and Congdon.

The supplement to the *Index Kewensis*, in fascicle 3, reaches Physaria.

The embryology, etc., of *Sequoia sempervirens* are discussed by Lawson in *Annals of Botany* for January, which also contains a historical account of the structure and morphology of ovules, by Worsdell.